

# FRBSF WEEKLY LETTER

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## Natural Resources and State Growth

Natural resource industries played an important role in the early development of many western states. In most, agriculture provided the initial impetus for development. Mining, particularly for gold and silver, attracted people and investment to parts of the West, and forest products provided a strong export base for the Pacific Northwest. Relatively recently, oil discoveries spurred economic development in Alaska.

At the same time, dependence on natural resource industries continues to be associated with severe regional economic cycles. The boom-bust experience in Alaska and other oil states is well known. Similarly, the 1981–82 recession brought demand for lumber to a standstill and wreaked havoc on the Oregon economy. A collapse of mineral prices savaged the mining states, after earlier price increases had boosted growth.

Many agree that natural resources have played an important role in the varied fortunes of states' economies; however, the ways in which natural resources affect growth are not well understood. This *Letter* compares the performance of resource-dependent and non-resource-dependent states over the 1964–86 period, and finds that the resource-dependent states outperformed the non-resource-dependent states over this period. The evidence suggests, however, that this superior performance can be traced to fortuitous price increases in the resource industries during the 1970s, and suggests that resource-dependence would slow economic growth in the absence of positive price shocks.

The evidence also reveals that gains in wealth in the resource sector stimulated industrial diversification in the resource-dependent states. Positive price shocks in resource industries have contributed sharply to economic diversification into non-resource industries. As a result, the share of western output produced by natural resource industries has fallen from 6.6 percent in 1964 to 4.5 percent in 1986.

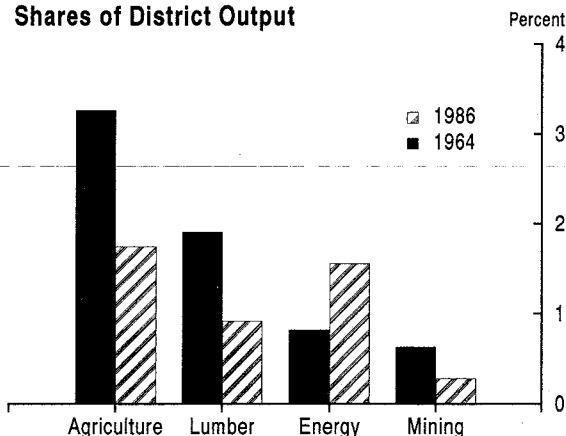
### Rich endowment

The natural resource endowments in the West are extensive. In 1986, the nine Twelfth District states accounted for 18 percent of the nation's agricultural output, 30 percent of forest products, 27 percent of mining output, and 15 percent of energy production.

Natural resources make up a significant portion of the western states' output, ranging from 34 percent in Alaska to two percent in Hawaii. Idaho ranks fifth in the nation in agricultural share of state output; Oregon, Idaho, and Washington have the largest shares of forest products; Arizona, Utah, and Nevada all rank in the top five in non-fuel mining's share of state output; and Alaska is near the top of the states in energy's share of state output.

In terms of shares of state output, the importance of these industries has fallen in recent years. As shown in the Chart, the share of total western output provided by resource industries has fallen since 1964, with all resource industries except energy losing share. Energy's share increased after 1964 because of the discovery of oil in Alaska, but barring major new discoveries, production is expected to fall in the next decade.

Shares of District Output



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## How resources affect growth

Differences in natural resource endowments explain major variations in industrial structure across regions. Not surprisingly, states that are heavily endowed with natural resources have larger-than-average sectors devoted to producing those resources. This is consistent with the principle of comparative advantage. A region with an abundance of low-cost natural resources has a readily available source of exports to other regions, particularly when those other regions lack the endowments to produce the resources themselves. New England states, for example, cannot become major oil producers because they simply do not have the oil reserves.

Natural resources also provide an important source of regional differences because natural resource production often was a key element in a region's early economic development. In many cases, an abundance of such natural resources as low-cost farm land, minerals, timber, or oil were major attractions for settlers.

Over time, new industries emerged to support the primary resource industries through the provision of services or equipment. In many cases unrelated industries also emerged to take advantage of the infrastructure created to support the resource industry. Eventually, most areas developed strong industries unrelated to natural resources. In fact, where other industries did not develop, ghost towns appeared when the resource base was exhausted. For those regions that continued to grow, the natural tendency was toward greater diversification, particularly away from natural resource industries. As a result, this historical source of regional specialization has become less important.

## Price effects

Beyond their influence on the industrial composition of a region, natural resources also have had a profound effect on regional growth through changes in relative income and wealth. Sudden changes in resource prices directly affect the income of the owners of the resource, many of whom reside in the region. These income changes tend to spill over into increased demand for other goods and services in the region. Natural resource price changes, therefore, can significantly affect the wealth of the region compared with that of non-resource-intensive regions.

Price changes are particularly important in extractive natural resource industries, such as mining, energy, and forestry. Often, the resource industry has little ability to expand or contract production in the wake of price movements. For example, current oil production is largely the result of drilling investments made years earlier; current drilling adds little to the total. In fact, even when oil prices rose 68 percent between 1979 and 1980, oil production in the United States did not rise in the subsequent year. And when oil prices dropped by half in 1986, production fell only four percent in the next year. Because production responds relatively little, the impact of price movements is felt through changes in profits.

Price effects work in three important ways. First, a sudden increase in prices signals an increased market value for that resource, and to the extent it is expected to persist, this increase in value raises the profitability of investing in that industry. Consequently, price increases can be expected to boost investment and employment in the resource sector and in resource processing, thus providing a strong source of growth relative to that in less resource-intensive regions.

Second, because an increase in resource prices raises the incomes of those employed in the resource industry and increases demand for inputs needed by the resource sector, it also boosts *non-resource* industry growth. Moreover, since extractive resource production often is limited in its ability to respond to rising prices, gains in the wealth of resource-owners tend to be invested in non-resource industries. When resource prices are high, for example, resource firms often diversify into non-resource production through acquisitions.

Finally, sharp resource price movements have an important effect in attracting or repelling labor and capital from other regions. Price increases often create a sense of optimism and opportunity that attracts in-migrants and investment. Laborers are attracted by the prospect of high-paying jobs. Expectations of rapid growth often become self-fulfilling, as investors pour in capital for new businesses and residential construction.

By the same token, when resource prices drop, in-migration slows dramatically, and investment from outside the region becomes harder to

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attract, as investors raise their assessment of the risks of investing in the region.

### Performance

Gross State Product data over the period from 1964 to 1986 reveal some interesting relationships between natural resource production and state growth. First, natural-resource-dependent economies tended to outperform the other states over this period as a whole. The top ten resource-dependent states (those with the largest shares of state output held by the resource industries) had average annual real growth of 3.4 percent, compared to the 2.6 percent growth registered by the other 40 states.

This faster growth was found across nearly all resource categories. The top five mining states and the top five forestry states grew at average annual real rates of 4.3 and 3.0 percent, respectively, compared to 2.6 percent in the remaining 45 states. The top ten energy states had average annual growth of 3.3 percent. Even in agriculture, growth in the top ten agricultural states matched the growth in the 40 less agriculturally-dependent states.

The performance of the resource-dependent states is not uniformly superior to that of non-resource-dependent states throughout the 1964–1986 period, however. For the most part, the resource-intensive states significantly outperformed the rest of the states from 1973 to 1981, but during the post-1981 period, the resource-dependent states grew more slowly than the other states.

### The role of price movements

Shifts in the relative performance of resource-dependent states are strongly correlated with resource price movements. To separate the effect of a region's dependence on its various resource industries from the effect of relative price changes in those industries, a simple econometric model was estimated.

Results suggest that price changes are an important factor explaining relative growth. In fact, after controlling for the effect of favorable price movements, the model suggests that a state's resource dependence does not signifi-

cantly contribute to growth, and actually may detract from that growth. Price movements, in contrast, directly affect relative growth, with positive movements boosting growth of resource-dependent states, and negative movements slowing growth. These results suggest that, *in the absence of favorable price movements*, the presence of a dominant resource sector probably slowed a state's growth during this period.

This conclusion is even stronger when one examines the separate contributions made by the resource industries, resource processing industries (such as food processing, pulp and paper, stone, clay, and glass, and petroleum refining), and other industries. The faster average growth in resource-dependent states was a direct result of faster growth in *non-resource-related* production. Resource output grew at an average annual rate just under one percent, and resource processing industries grew at 2.4 percent. In contrast, the other industries in the resource-dependent states registered average annual growth of 4.5 percent, considerably more rapid than the 2.6 percent growth in non-resource industry output registered by the non-resource-dependent states.

### Implications

The faster growth of non-resource-related industries from 1964 to 1986 suggests a trend away from resource dependence even in resource states. Although resource-dependent states had faster growth during this period, that growth largely can be attributed to fortuitous price shocks in the resource industries. The history of resource pricing suggests that such gains are not permanent. For example, recent declines in oil and agricultural prices have reversed most of the price increases in the 1970s.

Thus, a large resource sector can be beneficial to a region's growth when the industry experiences positive price shocks that stimulate non-resource production. But if prices fall or remain unchanged, slow growth (or actual decline) in resource industry output can slow the overall growth of resource-dependent states.

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